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Published in:
Journal of Intellectual Disability Research

DOI:
[10.1111/jir.12363](https://doi.org/10.1111/jir.12363)

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):
Frielink, N., Schuengel, C., & Embregts, P. J. C. M. (2017). Distinguishing subtypes of extrinsic motivation among people with mild to borderline intellectual disability. *Journal of Intellectual Disability Research*, 61(7), 625–636 . <https://doi.org/10.1111/jir.12363>

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Distinguishing subtypes of extrinsic motivation among people with mild to borderline intellectual disability

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Abstract

Background According to self-determination theory, motivation is ordered in types, including amotivation, extrinsic motivation and intrinsic motivation. Self-determination theory defines four subtypes of extrinsic motivation: external motivation, introjected motivation, identified motivation and integrated motivation. Although it has been argued theoretically that the different types of motivation are universally applicable, Reid *et al.* (2009) proposed a dichotomy of broad subtypes of extrinsic motivation for people with intellectual disability (ID) due to their cognitive limitations. The current study challenges this proposal by testing whether the four subtypes of extrinsic motivation can be differentiated among people with ID as well.

Method The subtypes of extrinsic motivation were measured using two adapted versions of the Self-Regulation Questionnaire, one regarding exercise and one regarding support. In total, 186 adults with mild to borderline ID participated in the study.

Results Results supported the distinction between the four subtypes of extrinsic motivation regarding both exercise and support. In addition, the correlation

coefficients supported a quasi-simplex pattern of correlations among the subtypes, indicating that adjacent subtypes were more closely related than non-adjacent subtypes. Moreover, the study showed sufficient Cronbach's alphas and test–retest reliabilities for early stage research.

Conclusions Overall, the results of the current study provide initial evidence for the universality of the four subtypes of extrinsic motivation across populations with and without ID.

Keywords extrinsic motivation, intellectual disability, motivation types, self-determination theory

Introduction

Motivation drives actions and personal growth (Ryan & Deci 2000a). That is, motivation is fundamental in providing individuals reason for a particular behaviour and plays an essential role in decision making and guiding behaviour. A classic distinction in motivation is one between extrinsic motivation and intrinsic motivation (Ryan & Deci 2000b). According to the self-determination theory (SDT), even more types of motivation need to be distinguished (Deci & Ryan 2000), rank ordered from total lack of motivation (amotivation) to engagement in an activity because the activity is in itself enjoyable or interesting (intrinsic motivation).

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This study focused on assessing distinctions between subtypes of extrinsic motivation with people with mild to borderline intellectual disability (ID).

Bridging amotivation and intrinsic motivation, the SDT distinguishes four subtypes of extrinsic motivation: external motivation, introjected motivation, identified motivation and integrated motivation. These subtypes of motivation are hypothesised to be universal across populations and behaviours and vary in the extent to which their regulation is self-determined (Ryan & Deci 2000a), which can be described as performing a behaviour out of personal interest or values. The first and least self-determined form of extrinsic motivation is labelled as external motivation and occurs when an individual takes action to obtain rewards, to obey to external requests or to avoid punishments. Second, introjected motivation drives action to avoid guilt and shame and to attain feelings of worth and pride (i.e. ego involvement). External motivation and introjected motivation are, together, considered as 'controlled motivation'. The third type of extrinsic motivation, a more self-determined form, is labelled identified motivation and refers to actions that are valued by the individual. Finally, the most self-determined form of extrinsic motivation is integrated motivation, driving actions that are fully integrated with other values and behaviours of the person. The last two types of extrinsic motivation (identified and integrated motivation), together with intrinsic motivation, are considered as 'autonomous motivation'.

According to Ryan & Deci (2000a), people may transform less self-determined forms of extrinsic motivation into more self-determined (or autonomous) forms of extrinsic motivation. The SDT proposes that social contexts that satisfy the three basic psychological needs for autonomy, competence and relatedness will foster more autonomous forms of extrinsic motivation. Autonomous forms of motivation have been found associated with positive behaviours and outcomes such as greater adherence to medications among people with chronic illnesses (Williams *et al.* 1998), greater involvement and better psychotherapy outcomes (Zuroff *et al.* 2007), greater levels of physical activity (Levesque *et al.* 2007), and greater life satisfaction and well-being (Ryan & Deci

2000a). In contrast, controlled types of motivation were associated with negative outcomes such as depression (Levesque *et al.* 2007) and psychological and physical ill-being (Deci & Ryan 2002).

To assess the different types of motivation, various questionnaires have been developed for people with average or above IQ (e.g. Ryan & Connell 1989; Vallerand *et al.* 1992). One of these scales, the Self-Regulation Questionnaire (SRQ), developed by Ryan & Connell (1989), is nowadays widely used to measure whether one's motivation for health behaviours is controlled or autonomous. The SRQ asks, for example, why people engage in healthy behaviours or enter treatment for a medical condition. Levesque *et al.* (2007) conducted a series of confirmatory factor analyses (CFA) to validate the factor structure of the Treatment SRQ (TSRQ) across four different universities and three different health behaviours (i.e. tobacco use, diet and exercise). They confirmed the hypothesised four-factor structure representing amotivation, external motivation, introjected motivation and autonomous motivation – not differentiating between identified motivation and integrated motivation – and found an acceptable internal consistency.

Although it has been argued that the different types of motivation are universally applicable (Deci & Ryan 2000), the vast majority of the studies focused on non-intellectually disabled people. Little attention has been paid to individuals with cognitive limitations, such as people with ID. Indeed, the domain of motivation has not been studied extensively within this field, but people with ID are often perceived as being less motivated and more passive (Emond Pelletier & Joussemet 2016). It should be noted however that the original SRQ scales were developed and used among children in grades 3–6 (Ryan & Connell 1989). Hence, children in the age range of 9–12 have shown ability to discriminate on the SRQ scales. Most adults with mild ID are capable within this reading and conceptual range. In addition, Deci *et al.* (1992) adapted the SRQ-Academic for students with learning disabilities on elementary school and high school, with a mean IQ of 88 (range: 58–142) and 83 (range: 55–121), respectively. They replicated the theorised structure of the original SRQ-Academic, suggesting that the distinction between external motivation, introjected motivation, identified motivation and intrinsic motivation can be made

among students with learning disabilities (integrated motivation was not included in this SRQ-version). Moreover, Grolnick & Ryan (1990) also used an adapted SRQ-Academic in students with learning disabilities. However, although the students had learning disabilities in both studies, the vast majority did not have an ID ($IQ < 70$). Recently, Frielink *et al.* (2015) used a version of the SRQ in a multiple-case experimental design ($N = 6$) to measure day-to-day motivation to change substance abuse among individuals with mild ID. They found that participants were able to discriminate easily between external motivation, introjected motivation and autonomous motivation.

Although using a different scale than the SRQ, Reid *et al.* (2009) decreased the number of extrinsic motivational types in their scale (i.e. pictorial motivation scale) because the subtle distinctions between the four types would elude the cognitive means of people with mild to moderate ID. That is, Reid and colleagues were 'concerned with the ability of our target population to distinguish among the four and wanted to keep the questionnaire as short as possible' (Reid *et al.* 2009, p.162). Therefore, they proposed a dichotomy of broad subtypes of extrinsic motivation (i.e. self-determined and non-self-determined motivation) instead of four subtypes of extrinsic motivation according to SDT. This amalgam was based primarily on theoretical assumptions and practical considerations rather than driven by data. Although this dichotomy is nowadays widely used in the general population, to the best of our knowledge, no studies have been conducted exploring the four subtypes of extrinsic motivation in people with ID. Developing more awareness of, and measurement tools that can tap, the varied motivational states experienced by people with ID may help towards more effective support of and respect for self-determination. Therefore, the current study challenges the proposal of Reid *et al.* (2009) by testing whether the four subtypes of extrinsic motivation proposed by SDT can be distinguished on the basis of responses from people with mild ID (defined as IQ between 50 and 70) and with borderline intellectual functioning (IQ between 70 and 85), hereafter designated as people with mild to borderline intellectual disability (MBID). As people with borderline intellectual functioning often have comparable characteristics and support needs to

people with mild ID, people with borderline intellectual functioning in the Netherlands are eligible to the same specialised mental health care organisations as people with an ID ($IQ < 70$). Hence, this target group is commonly included in research, practice and policy in the Netherlands.

We investigated the four subtypes of extrinsic motivation among people with MBID by using the SRQ regarding two different domains. The first domain focused on support. Although people with ID nowadays have increasing freedom of choice, they remain, more than people without ID, partly dependent of support provided by support staff to enhance health and well-being. Moreover, studying people's motivation in relation to support has distinct theoretical interest, as SDT has argued that dependence and autonomy are not each other opposites (Deci & Ryan 2002). That is, the opposite of autonomy is heteronomy, in which one's actions are perceived as controlled by forces that are alien to the self (Chirkov *et al.* 2003). SDT describes dependency as reliance on other people for support, guidance or supplies (Ryan & Lynch 1989). Hence, people can be autonomously dependent on others if they willingly trust their support. As support provided by support staff has no parallel in the previously studied populations of people without ID, exercise was included as a second, universally important domain.

The aim was to test whether theoretically a priori defined items representing the different subtypes of extrinsic motivation among non-intellectually disabled people had the same structure for people with MBID. Therefore, it was hypothesised that, using CFA, the structure of the four subtypes of extrinsic motivation according to SDT fit the data from people with MBID for both versions of the SRQ (i.e. SRQ exercise and SRQ support). To investigate this, three models were tested with respect to the SRQ exercise: model 1 (the null model): a four-factor model as proposed by SDT by differentiating between external motivation, introjected motivation, identified motivation and integrated motivation; model 2) a three-factor model based on Levesque *et al.* (2007) differentiating between external motivation, introjected motivation and autonomous motivation (Levesque and colleagues also included the subscale amotivation, but in the current study, this subscale was removed from the analyses as this subscale was

not included in the SRQ support); and model 3) a two-factor model as proposed by Reid *et al.* (2009) differentiating between non-self-determined extrinsic motivation (i.e. the amalgamation of external motivation and introjected motivation) and self-determined extrinsic motivation (i.e. the amalgamation of identified motivation and integrated motivation). As the factor structure between both versions of the SRQ was hypothesised to be similar, the adopted model for the SRQ exercise was tested for the SRQ support as well. In addition, it was hypothesised that the correlation coefficients of the four subtypes of extrinsic motivation would support a quasi-simplex pattern of correlations among the subscales for both SRQ-versions, indicating that adjacent subscales were more closely related than non-adjacent subscales. Moreover, the internal reliability and test–retest reliability of the SRQ exercise as well as the SRQ support were tested.

Methods and materials

Participants and procedures

After ethical approval by the Ethics Committee of Tilburg University, eligible participants were randomly selected from four ID services in the Netherlands. Inclusion criteria for participation in the current cross-sectional study were: having a mild to borderline ID (IQ 50–85), aged ≥ 18 years and at least weekly contact for a minimum of three months with support staff. In total, 368 individuals were invited to participate; 165 declined. After participation, 17 turned out not to meet the inclusion criteria (e.g. IQ data were not available) and were therefore afterwards excluded, resulting in 186 participants. Of those 186 participants, two did not fill in the SRQ exercise and one did not fill in the SRQ support. The participants had a mean age of 40.3 years (range 18.1 to 84.8); 76 were female (41.3%). The mean IQ on file was 67; 77 participants had a borderline level of intellectual functioning (IQ range 71–85) and 109 had a mild ID (IQ range: 50–70). Although the used IQ tests differed, most of the participants were tested with the WAIS III/WAIS IV.

Appointments took place at participants' home, but if participants wished so, other locations were possible as well. During each measurement, the researcher read aloud all items of each administered

questionnaire, while the participant could read along with the items. Next, the participants were invited to answer each item verbally by indicating the answer on a 1 to 5 Likert type scale, which was then recorded and logged by the researcher. Most participants responded using the numbers (e.g. 1), but some participants preferred responding using the qualifiers (e.g. completely untrue). Demonstrated by examples and narrative information provided by the participants during the data collection, the vast majority of the participants understood all items. For those who needed help, the researcher provided a standardised clarification. In the case a participant did not understand the item after this standardised clarification, the item was left blank and became a missing value.

In order to gauge the 2-week test–retest reliability, 20% of the participants ($n = 40$) were visited a second time. These 40 participants were randomly selected from the 203 individuals who initially participated in the current study; all agreed to participate. None of them belonged to the 17 individuals who were excluded from the study afterwards for not meeting the inclusion criteria.

Measures

Ryan & Connell (1989) developed a general approach to measure various types of motivation. Nowadays, as the SRQ has been widely used in studying behaviour change in health care settings, there are various versions of the SRQ (Williams *et al.* n.d.). In order to be appropriate for the particular behaviours being studied, the wording of the various SRQ-versions varies somewhat. Nevertheless, the different reasons that are used in each SRQ cover the various types of motivation as distinguished by SDT and thus are theoretically comparable (Williams *et al.* n.d.). Hence, although the wording of the SRQ exercise and the SRQ support differ, the motivation subtypes can be compared.

On the original SRQ questionnaires, the items are rated on a 7-point Likert scale. For the purpose of this study, the responses were given using five response choices (Hartley & MacLean 2006): 1 (completely untrue), 2 (untrue), 3 (neutral), 4 (true) and 5 (completely true). Moreover, in order to improve comprehension, in the current study, all items began with the stem (e.g. 'I would exercise because...')

rather than referring to the stem at the beginning of the questionnaire for each item. Prior to the data collection, five persons with MBID were invited to complete both versions of the SRQ. They found both scales easy to comprehend, and only a few minor adaptations to the phrasing and grammar were made to improve clarity, based on their recommendations. Based on the response pattern of these five individuals, the provided examples and narrative information, people with MBID seemed able to recognise their own motivation states and hence were able to distinguish between different types of extrinsic motivation. The full questionnaires can be obtained from the first author.

Self-Regulation Questionnaire exercise

The SRQ exercise was developed on the basis of the TSRQ-ID towards changing substance abuse related behaviours, which was adapted by Frielink *et al.* (2015) from Williams *et al.* (n.d.). That is, the items remained equal, but the stem of the items changed from 'I would change my behaviours because...' to 'I would exercise because...'. The SRQ exercise consisted of 15 items divided into the following subscales: amotivation (e.g. 'I have no idea why I would want to exercise'), external motivation (e.g. 'I would exercise because I then get respect from other people'), introjected motivation (e.g. 'I would exercise because I would feel guilty or ashamed of myself if I did not exercise regularly'), identified motivation (e.g. 'I would exercise because I think that is best for my health') and integrated motivation (e.g. 'I would exercise because it fits with what I consider important in my life'). A mean score for each subscale was computed by summing the scores of the associated items and dividing the total score by the number of items.

Self-Regulation Questionnaire support

The SRQ support was adapted from Williams *et al.* (1996), who focused on reasons for continuing to participate in a weight-loss program. The authors of the current study translated the items to Dutch and simultaneously simplified these items to improve comprehension by people with MBID without losing the essence of the items. This translation process is described in more detail in Frielink *et al.* (2015). For the purpose of the current study, we changed the

original stems 'I am staying in the weight-loss program because...' and 'I have been following the guidelines of the program because...' into 'I want to receive support because...' and 'I stick to my support appointments because...'. The SRQ support consisted of 12 items instead of the original 13; the item 'I am staying in the weight-loss program because I have invested so much money in this program' was removed as this item was not relevant for the present study as participants do not directly pay for the support. The SRQ support consisted of four subscales: external motivation (e.g. 'I want to receive support because other people may otherwise think that I am a weak person.'), introjected motivation (e.g. 'I stick to my support appointments because I will otherwise feel guilty'), identified motivation (e.g. 'I want to receive support because I think it is the best way to help myself.') and integrated motivation (e.g. 'I stick to my guidance agreements because I think that they help me reach my goals'). A mean score for each subscale was computed by summing the scores of the associated items and dividing the total score by the number of items.

Data analysis

To investigate the hypothesised distinction of the four subtypes of extrinsic motivation among people with MBID, a series of CFAs were conducted based on previous research among the non-intellectually disabled population. That is, regarding the SRQ exercise, three models were tested in CFA using Mplus 7.31 (Muthén & Muthén 1998–2015): model 1) a four-factor model as proposed by SDT by differentiating between external motivation, introjected motivation, identified motivation and integrated motivation; model 2) a three-factor model based on Levesque *et al.* (2007) differentiating between external motivation, introjected motivation and autonomous motivation; and model 3) a two-factor model as proposed by Reid *et al.* (2009) differentiating between non-self-determined extrinsic motivation and self-determined extrinsic motivation. It should be noted that although the SRQ exercise encompassed an amotivation subscale, this subscale was not included in the SRQ support, and therefore excluded from the analyses. As the factor structure between both versions of the SRQ was hypothesised

to be similar, the adopted model for the SRQ exercise was tested for the SRQ support as well.

The robust maximum likelihood MLR estimator for clustered continuous data was used. Although data were collected on an ordinal scale (5-point Likert scale), the data were treated as continuous because continuous MLR is a good estimation choice for ordinal data with five or more categories (Rhemtulla *et al.* 2012). To evaluate the goodness of model fit, the normed chi-square, the root mean square error of approximation (RMSEA), the Bentler Comparative Fit Index (CFI) and the standardised root mean square residual (SRMR) were used (Kline 2011; Schweizer 2010; see Table 1 for the used guidelines for what constitutes a good fit). In addition, the 'detection of misspecification' procedure (Saris *et al.* 2009) was used, as the traditional fit indices have important drawbacks (i.e. no control for type I and type II errors) (Marsh *et al.* 2004). To interpret the Modification Indices test for each of the restricted parameters of the model based on this procedure, Saris *et al.* (2009) suggest to set the minimum size of

the misspecification detected by the MI test with a high likelihood (power > .75) at .10. The chi-square difference test was used to choose the best model; if the increase in chi-square was not significant, the reduced model was chosen. However, because the chi-square difference test is sensitive to sample size and hence may lead to rejection of reasonable models (Marsh *et al.* 2004), the Bayesian Information Criterion (BIC) and CFI indices were also assessed. Models with the lowest BIC are preferred, and decreases in CFI fit > .01 support the reduced model (Cheung & Rensvold 2002).

In addition, the internal consistency of both the SRQ exercise and the SRQ support was determined by computing Cronbach's alpha. Furthermore, the 2-week test-retest reliability was gauged by computing Pearson correlations between the first and second measurement and determined by interviewing 20% of the participants ($n = 40$) a second time. Values between .50 and .60 are sufficient for early stages research, but values above .80 should be pursued (Nunnally *et al.* 1967).

Table 1 Guidelines to evaluate the goodness of model fit

	Acceptable model fit	Good model fit
Normed chi-square (Bollen, 1989)	<3.00	<2.00
RMSEA (Browne & Cudeck, 1993)	<.08	<.05
CFI (Hu & Bentler, 1999)	>.90	>.95
SRMR (Kline 2011)	<.10	

RMSEA, root mean square error of approximation; CFI, comparative fit index; SRMR, standardized root mean square residual.

Results

The means, standard deviations and range of the data of the hypothesised subscales of both the SRQ exercise and the SRQ support are presented in Table 2.

Confirmatory factor analyses (CFA)

A series of CFA using Mplus 7.31 (Muthén & Muthén 1998–2015) were conducted to test the hypothesised factorial structure of the SRQ regarding both exercise and support.

Table 2 Means, standard deviations and the range of the data of the subscales in this study

Factor	SRQ exercise			SRQ support		
	Mean	SD	Min–Max	Mean	SD	Min–Max
External motivation	1.98	0.63	1.0–4.5	2.21	0.64	1.0–4.3
Introjected motivation	2.28	0.88	1.0–5.0	2.28	0.74	1.0–5.0
Identified motivation	3.84	0.83	1.0–5.0	4.02	0.62	2.0–5.0
Integrated motivation	3.44	0.95	1.0–5.0	3.69	0.61	1.5–5.0

SRQ, Self-Regulation Questionnaire.

Self-Regulation Questionnaire exercise

The global fit measures of the three tested models are presented in Table 3. Based on these fit measures, model 1 yielded a substantially better fit than the other two models. Although the chi-square test for the four-factor model was significant and only the SRMR met the recommended cut-off value, the model showed potential and provided the starting point for further investigation.

Based on the 'detection of misspecification' procedure (Saris *et al.* 2009), examination of modification indices resulted into six relevant misspecifications. The modification index between items 12 and 14 (both items belonged to the same latent variable) influenced the model fit the most, and therefore a parameter between those items was added. As a result the model fit increased (normed chi-square = 2.69, RMSEA = .096, CFI = .91, SRMR = .087); however, the RMSEA criterion was still not met. Moreover, examination of modification indices showed two relevant misspecifications. Adding a parameter between the most influencing modification index between items 1 and 8 (both items belong to the same latent variable) resulted in an almost acceptable model (normed chi-square = 2.26, RMSEA = .083, CFI = .93, SRMR = .086); the RMSEA-criterion of <.080 was not met. Additionally, this model yielded one misspecification, between items 3 and 8. As both items appertained to the same latent variable, a parameter was added, resulting in an acceptable model (normed chi-square = 2.16, RMSEA = .079, CFI = .94, SRMR = .088). However, this four-factor model with three additional parameters contained one misspecification, between items 8 and 13. Whereas adding a parameter between

these two items resulted in a model without misspecifications, it did not change the fit indices substantially. As this misspecification had no influence on the model, it is acceptable to maintain this misspecification into the model. So, by adding three parameters to the four-factor structure, the model fit is acceptable. However, as two of these misspecifications were related to item 8, another possibility was to remove item 8 from the model. The removal of item 8, in addition to the extra parameter between items 12 and 14, resulted in a similar acceptable model fit: normed chi-square = 2.12, RMSEA = .078, CFI = .94, SRMR = .080. Although this model contained one misspecification between items 6 and 7, it did not change the fit indices substantially, which therefore can be ignored. Because both acceptable models were similar, the model without item 8 was adopted, because it was simpler to interpret.

For this model (four factors with item 8 removed and one additional parameter between items 12 and 14, see Fig. 1), all factor loadings were significant at a $p < .001$ level. The standardised factor loadings varied between .46 and .93 (see Fig. 1). The correlation coefficients supported a quasi-simplex pattern of correlations among the subscales; adjacent subscales were more closely related than non-adjacent subscales (see Fig. 1 for the correlations between the subscales). That is, for example, external motivation and introjected motivation were substantially higher correlated ($r = .66$) than external motivation and integrated motivation ($r = .03$).

Self-Regulation Questionnaire support

The CFA results of the SRQ exercise were the starting point of the CFA regarding the SRQ support.

Table 3 Comparison of the three tested models regarding SRQ exercise ($N = 184$)

Model	χ^2	df	χ^2/df	RMSEA (90% CI)	CFI	SRMR	BIC	$\chi^2\Delta$ (df) [†]
1. Four-factor model	152.03*	48	3.17	.109 (.089; .128)	.88	.083	4976.79	—
2. Three-factor model	216.84*	51	4.25	.133 (.115; .151)	.81	.090	5069.28	64.81 (3)*
3. Two-factor model	252.93*	53	4.77	.143 (.126; .161)	.77	.106	5105.44	100.09 (5)*

Df, degrees of freedom; RMSEA, root mean square error of approximation; CFI, comparative fit index; SRMR, standardized root mean square residual; BIC, Bayes information criterion.

[†] $\chi^2\Delta$ (df), chi-square difference test comparing the fit of models 2 and 3 with model 1; df is the difference in degrees of freedom between the two compared models.

* $p < .05$.

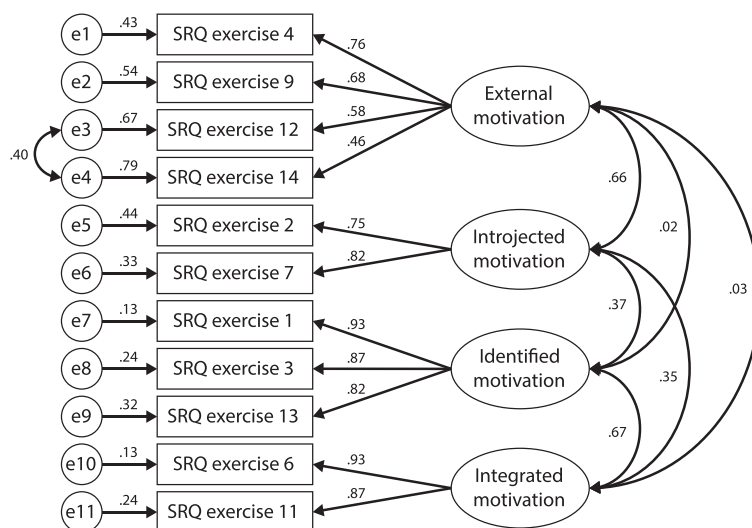


Figure 1 Visual representation of the four-factor model regarding the Self-Regulation Questionnaire (SRQ) exercise ($N = 184$). The circles represent the latent variables and the rectangles represent items. Numbers to the left of the rectangles represent residuals (expressed as covariance). Numbers between the single-arrow-lines connecting latent variables and items indicate a hypothesized direct effect (expressed as standardized regression coefficients). Numbers between the bidirectional arrows connecting the latent variables imply a relationship between factors (expressed as correlations).

Because of the removal of item 8 of the SRQ exercise, which is equivalent to item 6 of the SRQ support, item 6 was removed prior to the analyses. Next, in order to test whether a similar factor structure can be found between the SRQ exercise and the SRQ support, the global fit measures of a four-factor model were gauged: normed chi-square = 2.39, RMSEA = .087, CFI = .87, SRMR = .069. Although the chi-square test was significant and the RMSEA and CFI did not meet the recommended cut-off values, the model showed potential and provided the starting point for further investigation. Examination of the modification indices on the basis of the detection of misspecification procedure (Saris *et al.* 2009) resulted into 10 relevant misspecifications. The item that was most involved in several high modification indices was item 12. Consequently, this item was removed from the model for additional analyses.

A renewed CFA was conducted based on the remaining 10 items (i.e. item 6 was removed in advance and item 12 was removed based on the initial CFA), which resulted in a substantially improved model fit: normed chi-square = 2.13, RMSEA = .078, CFI = .91, SRMR = .064. Although the chi-square test for the four-factor model was significant, all fit indices met the recommended cut-off values. However, the model contained six misspecifications. As adding a parameter between items 3 and 5 (the modification index is the highest for those items) resulted in a substantially improved model fit, this

misspecification cannot be ignored. Nevertheless, adding this parameter was not appropriate, because items 3 and 5 appertained to different latent variables. Therefore, removing one of the two items from the model was deemed to be the best solution. As item 3 appertained to a latent variable consisting of two items, this item could not be removed, and hence, item 5 was removed. This resulted in a similar model fit (normed chi-square = 2.13, RMSEA = .078, CFI = .93, SRMR = .062) containing three misspecifications (between items 1 and 7, items 7 and 10, and items 3 and 9). Although adding a parameter between any of these items substantially improved model fit, this was not appropriate as these items appertained to different latent variables. Therefore, removing one item from the model was deemed to be the best solution. As items 1 and 7 appertained to a latent variable consisting of two items, only item 10 could be removed. This resulted in a good model fit (normed chi-square = 1.38, RMSEA = .045, CFI = .98, SRMR = .049). Although this model contained one misspecification between items 1 and 7, it did not change the fit indices substantially, which therefore can be ignored. So, to summarise, the four-factor model without items 6, 12, 5 and 10 was adopted (see Fig. 2).

All factor loadings were significant at a $p < .001$ level. The standardised factor loadings varied between .48 and .87 (see Fig. 2). Similar to the SRQ exercise, the correlation coefficients supported a

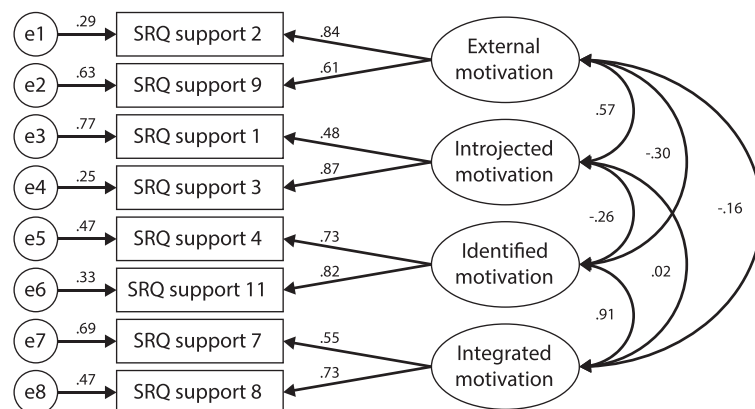


Figure 2 Visual representation of the four-factor model regarding the Self-Regulation Questionnaire (SRQ) support ($N = 185$). The circles represent the latent variables, and the squares represent items. Numbers to the right of the squares represent residuals (expressed as covariance). Numbers between the single-arrow-lines connecting latent variables and items indicate a hypothesized direct effect (expressed as standardized regression coefficients). Numbers between the bidirectional arrows connecting the latent variables imply a relationship between factors (expressed as correlations).

quasi-simplex pattern of correlations among the subscales, indicating that adjacent subscales were more closely related than non-adjacent subscales (see Fig. 2 for the correlations between the subscales).

Reliability

The internal consistency of the SRQ exercise was found to be Cronbach's alpha .83, and for the SRQ support .59. The internal consistency for each latent variable is reported in Table 4; these ranged between .56 and .91. The 2-week test-retest reliabilities ($M = 14.6$ days, $SD = 2.0$, range = 11.0 – 21.0) of the SRQ factors ranged between .54 and .78 (see Table 4).

Discussion

The results of this study supported the distinction between the four subtypes of extrinsic motivation as proposed by SDT – external motivation, introjected

motivation, identified motivation and integrated motivation – using the SRQ for exercise among people with MBID in the Netherlands. With several modifications to the model, a similar four-factor structure of the SRQ support was found. In addition, the correlation coefficients supported a quasi-simplex pattern of correlations among the subscales of both SRQ versions, indicating that adjacent subscales were more closely related than non-adjacent subscales. That is, the high correlation coefficients between external motivation and introjected motivation (together controlled motivation) and between identified motivation and integrated motivation (together autonomous motivation) indicated the difference between controlled motivation and autonomous motivation. This finding is important, as it implies that the phenomenal classification of these types of motives falls along a continuum of autonomy. The fact that this dimensional pattern emerges reveals that motivation is nuanced in people with MBID, too.

Table 4 Internal consistencies and test-retest correlations of the four subtypes of extrinsic motivation according to the self-determination theory

Factor	Internal consistencies [†]		Test-retest reliabilities [‡]	
	SRQ exercise	SRQ support	SRQ exercise	SRQ support
External motivation	.74	.66	.78	.65
Introjected motivation	.76	.58	.57	.71
Identified motivation	.91	.75	.66	.62
Integrated motivation	.90	.56	.54	.77

SRQ, Self-Regulation Questionnaire.

[†]Internal consistencies are measured as Cronbach's alpha.

[‡]Test-retest reliabilities are measured as Pearson correlations.

The four-factor structure is consistent with SDT (Ryan & Deci 2000). Although the correlation coefficients supported a quasi-simplex pattern of correlations, the results are not in line with the proposal of Reid *et al.* (2009) to distinguish two broad subtypes of extrinsic motivation instead of four subtypes of extrinsic motivation. While Reid and colleagues decreased the motivational types as an adaptation to the cognitive limitations of people with MBID, the current study indicated that the responses to items by people with MBID reveal a four-dimensional structure of extrinsic motivation.

Moreover, the findings of the current study undermine the assumption of Katz & Cohen (2014) that results of self-reported questionnaires are questionable because people with ID may experience difficulties with activities requiring symbolic, abstract and conceptual thinking and with responding to cognitive complex sentences. Katz & Cohen (2014) therefore used a projective instrument as an alternative research approach to assess autonomous motivation in students with borderline ID. Although the current results indicated that people with MBID are able to distinguish between different types of motivation based on relatively complex psychological constructs, it would be interesting to compare both approaches in one study to collate whether the different approaches result into the same assessment.

The domain of motivation has not been studied extensively within the ID field, but people with ID are often perceived as being less motivated and more passive (Emond Pelletier & Joussemet 2016). Although it was not the primary aim of the current study, our findings did not confirm this assumption. Indeed, the results of the study show that participants generally experienced autonomous motivation for both exercise and support rather than controlled motivation. When comparing the mean scores of the current study with the results described by Reid *et al.* (2009), the scores in the current study were higher. That is, where Reid and colleagues reported mean scores of 2.12 and 1.70 for the subscales self-determined extrinsic motivation and non-self-determined extrinsic motivation, respectively, the current study found mean scores of 3.64 and 2.13 for these combined subscales. Future research is needed to explore whether the used method (i.e. self-report questionnaire vs. pictorial scale) might have caused this difference.

Regarding the reliability of the SRQ among people with MBID, the current study showed sufficient Cronbach's alphas and test-retest reliabilities for early stage research for both SRQ versions. Regarding the test-retest reliabilities, the reliability scores differed fairly on three of the four scales, of which two were in favour of the SRQ support. That is, the scores on the SRQ support were more stable on two separate occasions than the scores on the SRQ exercise. A possible explanation for the higher test-retest reliability of the SRQ support might be that people with MBID are lifelong more or less dependent from support staff. Therefore, it might be hard for them to imagine a life without support staff, and hence, motives for receiving the support might not fluctuate much within a two-week period. In contrast, motivation for exercising might change more easily over time and can even be influenced by the course of everyday life. Cronbach's alphas differed fairly on three of the four scales, too, in favour of the SRQ exercise. A possible explanation for the relatively low and fluctuating alphas is the formulation of some of the items, for example, 'I stick to my support appointments because I want other people to see that I really do my best'. Although this item appertained to the subtype external motivation, the word 'want' also implies a more autonomous character. Moreover, the items regarding introjected motivation consisted of an avoidant type aimed at avoiding low self-worth rather than an approach type aimed at attaining high self-worth (Assor *et al.* 2009). A mixture between both types might increase the reliability of the subscale. The limited number of items for each scale is deemed to be another clarification for the relatively low and fluctuating alphas. While the internal consistency and the test-retest reliabilities are relatively low for both versions of the SRQ, it should be noted that measuring motivation among people with MBID is in the early stage of research. In this respect, Nunnally *et al.* (1967) recommended the acceptance of modest alpha reliabilities of .50 to .60. All Cronbach's alphas were higher than the minimum value of .50. The Spearman – Brown prophecy formula was used to compute the equivalent internal consistency values if two-item scales had been represented by more items. For example, a two-item scale with an alpha of .56 would have an alpha > .70 with a four-item scale, which is an acceptable reliability. Hence, adding items to each scale in future research would be highly desirable.

Limitations and implications for future research

Some limitations of this study should be mentioned. First, 165 of the 368 individuals who were invited to participate in the study declined. As there were no demographics available for the non-participants, it was not possible to compute the potential non-response bias by comparing participants with non-participants. When asked for the reason not to participate, the non-participants mainly indicated that they declined because of the time investment (1.5 h) or because support staff reasoned participation would be too stressful for them. Second, although the presented data in the current study point toward potential construct validity, more research is needed. Third, only a small number participated in the test–retest reliability ($n = 40$), and results should be replicated with larger sample sizes. Fourth, there was no cross-validation sample available in order to test the generalisability of the presented models.

Concluding remarks

Overall, the results of the current study provide initial evidence for the universality of the four subtypes of extrinsic motivation across populations with and without ID. This is important as the more differentiated our understanding of motivation in people with MBID, the better we can design training and interventions programs that optimally motivate self-care and enhance flourishing.

The results should nevertheless be interpreted with caution, because more research is needed to further improve the reliability of the SRQ among people with MBID. Adding items to the scales seem to be an important first step in this respect. Moreover, future research should focus on more extensive construct validity of the SRQ. Examination of the SRQ constructs for people with MBID in both behaviour change initiatives as well as in daily life activities (e.g. exercise, healthy diets) would be both descriptively and clinically helpful. In addition, future research might focus on the evaluation of the predictive validity to further confirm the validity of the SRQ. It is recommendable to examine the association between the different subtypes of extrinsic motivation and various outcomes (e.g. involvement in therapy, well-being and maintenance of change over time) among people with MBID.

References

- Assor A., Vansteenkiste M. & Kaplan A. (2009) Identified versus introjected approach and introjected avoidance motivations in school and in sports: the limited benefits of self-worth strivings. *Journal of Educational Psychology* **101**, 482–97.
- Cheung G. W. & Rensvold R. B. (2002) Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling* **9**, 233–55.
- Chirkov V., Ryan R. M., Kim Y. & Kaplan U. (2003) Differentiating autonomy from individualism and independence: a self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology* **84**, 97–110.
- Deci E. L., Hodges R., Pierson L. & Tomassone J. (1992) Autonomy and competence as motivational factors in students with learning disabilities and emotional handicaps. *Journal of Learning Disabilities* **25**, 457–71.
- Deci E. L. & Ryan R. M. (2000) The “what” and “why” of goal pursuits: human needs and the self-determination of behaviours. *Psychological Inquiry* **11**, 227–68.
- Deci E. L. & Ryan R. M. (2002) *Handbook of Self-determination Research*. University Rochester Press, Rochester.
- Emond Pelletier J. & Joussemet M. (2016) The benefits of supporting the autonomy of individuals with mild intellectual disabilities: an experimental study. *Journal of Applied Research in Intellectual Disabilities*. DOI: 10.1111/jar.12274.
- Frielink N., Schuengel C., Kroon A. & Embregts P. J. C. M. (2015) Pretreatment for substance abusing people with intellectual disabilities: intervening on autonomous motivation for treatment entry. *Journal of Intellectual Disability Research* **59**, 1168–82.
- Grolnick W. S. & Ryan R. M. (1990) Self-perceptions, motivation, and adjustment in children with learning disabilities: a multiple group comparison study. *Journal of Learning Disabilities* **23**, 177–84.
- Hartley S. L. & MacLean W. E. (2006) A review of the reliability and validity of Likert-type scales for people with intellectual disability. *Journal of Intellectual Disability Research* **50**, 813–27.
- Katz I. & Cohen R. (2014) Assessing autonomous motivation in students with cognitive impairment. *Journal of Intellectual and Developmental Disability* **39**, 323–32.
- Kline R. B. (2011) *Principles and Practice of Structural Equation Modeling*. Guilford press, London.
- Levesque C. S., Williams G. C., Elliot D., Pickering M. A., Bodenhamer B. & Finley P. J. (2007) Validating the theoretical structure of the Treatment Self-Regulation Questionnaire (TSRQ) across three different health behaviours. *Health Education Research* **22**, 691–702.
- Marsh H. W., Hau K.-T. & Wen Z. (2004) In search of golden rules: comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in

- overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling* **11**, 320–41.
- Muthén L. K. & Muthén B. O. (1998–2015) *Mplus User's Guide*, 7th edn. Muthén & Muthén, Los Angeles.
- Nunnally J. C., Bernstein I. H. & Berge J. M. T. (1967) *Psychometric Theory*. McGraw-Hill, New York.
- Reid G., Vallerand R. J., Poulin C. & Crocker P. (2009) The development and validation of the pictorial motivation scale in physical activity. *Motivation and Emotion* **33**, 161–72.
- Rhemtulla M., Brosseau-Liard P. E. & Savalei V. (2012) When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods* **17**, 354–73.
- Ryan R. M. & Connell J. P. (1989) Perceived locus of causality and internalization: examining reasons for acting in two domains. *Journal of Personality and Social Psychology* **57**, 749–61.
- Ryan R. M. & Deci E. L. (2000a) Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist* **55**, 68–78.
- Ryan R. M. & Deci E. L. (2000b) Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemporary Educational Psychology* **25**, 54–67.
- Ryan R. M. & Lynch J. H. (1989) Emotional autonomy versus detachment: revisiting the vicissitudes of adolescence and young adulthood. *Child Development* **60**, 340–56.
- Saris W. E., Satorra A. & van der Veld W. M. (2009) Testing structural equation models or detection of misspecifications? *Structural Equation Modeling* **16**, 561–82.
- Schweizer K. (2010) Some guidelines concerning the modeling of traits and abilities in test construction. *European Journal of Psychological Assessment* **26**, 1–2.
- Vallerand R. J., Pelletier L. G., Blais M. R., Briere N. M., Senecal C. & Vallieres E. F. (1992) The Academic Motivation Scale: a measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement* **52**, 1003–17.
- Williams G. C., Ryan R. M. & Deci E. L. (n.d.). Health-care, self-determination theory questionnaire packet. Available at: <http://www.selfdeterminationtheory.org/health-care-self-determination-theory> (retrieved 22 May 2016).
- Williams G. C., Grow V. M., Freedman Z. R., Ryan R. M. & Deci E. L. (1996) Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology* **70**, 115–26.
- Williams G. C., Rodin G. C., Ryan R. M., Grolnick W. S. & Deci E. L. (1998) Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology* **17**, 269–76.
- Zuroff D. C., Koestner R., Moskowitz D., McBride C., Marshall M. & Bagby M. R. (2007) Autonomous motivation for therapy: a new common factor in brief treatments for depression. *Psychotherapy Research* **17**, 137–47.

Accepted 18 January 2017